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CORRESPONDENCE

**Research Correspondence**

# Why Not Just Call It Tako-Tsubo Cardiomyopathy

## A Discussion of Nomenclature

**To the Editor:** In 1991, Dote et al. (1) reported 5 patients with a novel, acute cardiac condition characterized by distinctive regional left ventricular (LV) systolic dysfunction, in the absence of significant atherosclerotic coronary artery disease. Other Japanese investigators were intrigued by the unusual end-systolic shape of the LV, which resembled the "tako-tsubo," a fisherman's pot with a round bottom and narrow neck used for trapping octopuses (2–4). Consequently, the term tako-tsubo was introduced to describe a new cardiomyopathic syndrome characterized by reversible LV systolic dysfunction.

Over the next 2 decades, this condition became widely recognized in Japan and subsequently gained international recognition with reports from 6 continents and 14 diverse countries: France, U.S., Belgium, Mexico, Australia, Spain, South Korea, China, Brazil, Germany, Israel, South Africa, Turkey, and Iceland. In the process, this condition acquired a remarkable multiplicity of 75 individual descriptive names (Table 1), emphasizing those disease features most impressive to individual investigators. As additional information emerged, new insights led to more names.

With this dramatic surge in recognition, many reports were published (a total of >1,000; increasing to 300/year), and it became evident that this entity has a much more heterogeneous clinical presentation than initially considered (5–8). This is not unexpected when a "new" cardiac disease emerges, and is reminiscent of the circumstance in hypertrophic cardiomyopathy another diverse disease that acquired a myriad of names (9).

Most reports of this novel nonischemic cardiomyopathy included several hallmarks (8,10): 1) acute clinical presentation: usually with substernal chest pain, triggered by stressful life circumstance, occurring in elderly women, and requiring differential diagnosis from acute coronary syndrome; 2) LV systolic dysfunction: unique regional contraction abnormalities usually involving the mid-to-distal chamber, not corresponding to the vascular distribution of a single coronary artery; and 3) reversibility: normalization of LV wall motion and global function over several days.

However, it is now apparent that a number of these disease features do not apply universally to all patients (5,7,8,10,11). Notably, the commonly used term "stress cardiomyopathy" implies this condition is inevitably triggered by physical or emotional stress (5,8,10). However, in an important minority of patients, a detailed personal history does not elicit an antecedent event. Also, the initial impression that this cardiomyopathy is confined to women of advanced age is no longer tenable, with reports of men and patients <50 years (including children) becoming more frequent (5–8,10). Furthermore, disease reversibility has not proved characteristic of all patients, because a small proportion (approximately 2%) do not survive, even with emergent treatment, and 5% to 10% of patients incur repetitive episodes (8,12).

**Table 1 Names Tabulated From Published Reports**

| |
|---|
| Apical ballooning |
| Apical ballooning syndrome |
| Acute left ventricular apical ballooning syndrome |
| Left ventricular apical ballooning syndrome |
| Transient left ventricular apical ballooning syndrome |
| Primary apical ballooning |
| Transient apical ballooning |
| Transient apical ballooning syndrome |
| Transient cardiac apical ballooning syndrome |
| Transient left apical ballooning syndrome |
| Transient cardiac ballooning |
| Left apical ballooning syndrome |
| Acute apical ballooning syndrome |
| Cardiac apical ballooning syndrome |
| Apical ballooning |
| Apical ballooning without apical ballooning |
| Apical ballooning cardiomyopathy |
| Reversible apical ballooning of left ventricle |
| Left ventricular ballooning syndrome |
| Mid-ventricular variant of transient apical ballooning |
| Mid-ventricular ballooning syndrome |
| Transient left ventricular mid-portion ballooning |
| Transient mid-ventricular ballooning |
| Transient mid-ventricular ballooning cardiomyopathy |
| Transient left ventricular non-apical ballooning |
| Reverse or inverted left ventricular apical ballooning syndrome |
| Inverted left ventricular apical ballooning syndrome |
| Transient basal ballooning |
| Tako-tsubo |
| Takotsubo cardiomyopathy |
| Takotsubo-like cardiomyopathy |
| Takotsubo syndrome |
| Takotsubo disease |
| Takotsubo left ventricular dysfunction |
| Takotsubo-like left ventricular dysfunction |
| Takotsubo-like transient biventricular dysfunction |
| Takotsubo-like transient left ventricular ballooning |
| Takotsubo-shaped cardiomyopathy |
| Takotsubo-shaped hypokinesia of left ventricle |
| Takotsubo-type cardiomyopathy |
| Takotsubo transient left ventricular apical ballooning |
| Mid-ventricular takotsubo cardiomyopathy |
| Mid-ventricular form of takotsubo cardiomyopathy |
| Inverted takotsubo contractile pattern |
| Inverted takotsubo cardiomyopathy |
| Inverted takotsubo pattern |
| Atypical takotsubo cardiomyopathy |
| Reverse takotsubo syndrome |
| Atypical basal type takotsubo cardiomyopathy |

*Continued on next page*

**Table 1 Continued**

- Stress cardiomyopathy
  - Acute stress cardiomyopathy
  - Human stress cardiomyopathy
  - Acute & reversible cardiomyopathy provoked by stress
  - Stress-induced cardiomyopathy
  - Stress-induced takotsubo cardiomyopathy
  - Stress-induced apical ballooning syndrome
  - Stress-related left ventricular dysfunction
  - Stress-related cardiomyopathy
  - Stress-related cardiomyopathy syndrome
  - Stress takotsubo cardiomyopathy
  - Emotional stress-induced ampulla cardiomyopathy
  - Mid-ventricular stress cardiomyopathy
  - Atypical transient stress-induced cardiomyopathy
  - Stress-induced myocardial stunning
  - Emotional stress-induced tako-tsubo cardiomyopathy
  - Stress-associated catecholamine induced cardiomyopathy
  - Neurogenic stress syndrome
  - Other
    - Neurogenic stunned myocardium
    - Adrenergic cardiomyopathy
    - Broken heart syndrome
    - Ampulla cardiomyopathy
    - Ampulla-shaped cardiomyopathy
    - "Chestnut-shaped" transient regional left ventricular hypokinesia
    - Ball-shaped spherical dilation of left ventricular apex
    - The artichoke heart
    - Transient mid-ventricular akinesia
    - Transient antero-apical dyskinesia

Although some diversity is evident in patterns of regional LV systolic dysynergy ("ballooning"), each of the variants is similar to the "classic" circumferential mid and apical LV dyskinesia with sparing of the basal segment. Subclassifying and renaming this cardiomyopathy according to specific LV contraction patterns could lead to more confusion (11).

The broad clinical spectrum of this acute cardiomyopathy also suggests that heterogeneous and multifactorial pathophysiologic mechanisms and susceptibilities are involved, because no single etiologic variable (e.g.,"stress," sex, age) can account for all affected patients (5–8,10–12). Imprecise nomenclature can impair a full understanding of clinical profile, and it can influence investigation into underlying mechanisms. Indeed, none of the proposed mechanisms—catecholamine excess and increased sympathetic tone, epicardial coronary spasm or myocardial bridging, genetic status, psychological factors, antidepressant drugs, hormonal influences, endothelial or microvascular dysfunction, and myocardial stunning—can explain all occurrences of this cardiomyopathy.

There is no universally accepted terminology or consensus for the novel acute cardiomyopathy discussed here, now 20 years since its appearance in published reports. Many commonly used terms, such as "stress cardiomyopathy," no longer accurately describe the diverse clinical spectrum of this condition and consequently are potentially misleading with respect to presentation, management, and underlying pathophysiology. The popular (and original) term "tako-tsubo cardiomyopathy," which describes the unusual LV contractile pattern, would seem the most appropriate and convenient name—general enough to allow future clinical variants to be included within this nomenclature, and with the advantage of acknowledging Japanese investigators who were responsible for its initial recognition and description.

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## Letters to the Editor

# Common Variant on Chromosome 9p21 Predicts Severity of Coronary Artery Disease

We read with great interest the paper by Dandona et al. (1) and the accompanying editorial commentary by Anderson and Horne (2), published in a recent issue of the *Journal*. Dandona et al. (1)